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PHYSICAL PAPERS.

- I. *Description of four remarkable Fishes, taken near the Piscataqua in New Hampshire.* By WILLIAM D. PECK, Esq. A.A.S.

THAT part of the Atlantic which washes the extensive sea coast of Massachusetts, affords a considerable number of Fishes, many of which are but little known ; and very few have been systematically noticed. This is not surprising, when it is considered that our fishermen are very inattentive to any but such as are esteemed fit for food. Of these the number is comparatively small, nor are the specific characters of them as yet ascertained. Four Fishes of different genera will be the subject of this paper.

The first, (Plate II. fig. 1.) was brought me by a boy who called it a white eel. The head of this fish is naked and whitish ; the vertex flattened, the upper and hinder edge of the orbits a little elevated. The nostrils are tubular, and situated near the extremity of the snout, which is obtuse.

The upper jaw is shorter than the lower, and furnished with a double row of small teeth ; and a single row of larger, curved teeth, inserted in the margin of the palate. The lower jaw is without a beard ; the front teeth in a tripple, and the lateral ones in a double row, all curving back.

The

The branchial membrane is expanded, naked, and supported by six bones.

The eyes, rather small and black, have the iris somewhat silvery, and are a little sunk in their orbits. The head is $1\frac{7}{16}$ inch in length.

The body is long, nearly round, slippery, and destitute of scales ; diminishing gradually from the beginning of the anal fin, and ending obtusely at the insertion of the tail. The colour of the body is nearly that of the human skin, with scattered blotches of a pale rust-colour.

There is no lateral line. The anus is placed before the equilibrium of the fish.

The dorsal fin occupies the whole length of the back, beginning a little behind the region of the pectoral fin, and extending to the tail, with which it is connected by its membranes. It is supported by LXXVI simple rays, which do not perforate the margin of the fin.

The pectoral fin is small, of a broad oval figure, inserted a little behind the branchial aperture, and furnished with XIV soft, branched rays.

There are no ventral fins. The anal fin has XLIX rays, the three first of which are simple, the rest branched. It extends to the tail, with which like the dorsal fin, it is united by its membranes. The last rays in both are a little removed from those of the tail, so that they are easily distinguished.

The

The caudal or tail fin is rounded and supported by XXII branched rays, and marked with numerous black dots.

From the above particulars, this fish appears to be a species of *Ophidium* or Snakefish, and approaches most nearly the *Ophidium imberbe* of Linnæus, which he says, is an inhabitant of the Baltic, and often found within the shells of oysters.* He observes also that the dorsal fin has ten spots;* but the specimen above described is above nineteen inches in length, and the back fin of an uniform colour. It may be called for the present *Ophidium (imberbe) maxillis imberbibus, cauda rotundata, pinnâ dorfi unicolore*. It was taken in a muddy creek in the river Piscataqua, and is the only individual of this genus that I have met with.

Whether it is in fact a variety of the *Ophidium imberbe* of Linné, or a new species, time may discover. It is sketched at fig. I.

Fig. II. (Plate II) represents a fish which was brought me in the month of August. The body of this fish is nearly ovate, compressed, and its breadth is equal to about one third of its length; thickest in the middle; gently convex, and becoming thinner to an edge, at the back and abdomen. The colour of the back is dark, especially the head, which is nearly black and destitute of scales.

The head is compressed and declining from its union with the body to the nose; of the same thickness with the body; and from the extremity of the upper lip, to the angle of the
opening

* *Fauna svecica* edit. 2da. Stockholm, 1761, page 114.

opening of the gills is equal to $\frac{1}{4}$ th of the length of the fish. The mouth obliquely descending, backward, and of a middling size. The rostrum obtuse. The upper jaw a little shorter than the lower. The teeth very small, cylindric, strait, erect, equal, and closely set, in a single row, in the margin of both mandibles. The tongue entire and rounded. The palate destitute of teeth. The nostrils double ; nearer to the rostrum than to the eyes ; the anterior foramen small and round, the posterior larger and vertically oblong. The eyes are lateral, nearly in the middle of the head, almost round, naked ; the iris silvery with the upper part blueish ; the pupil rather large and black. The covers of the gills, are formed of two laminae, the exterior of which is smaller, semiovate, marked with obscure furrows disposed in a radiate form, and of a silver colour : the interior is larger, and contained within the segment of a circle, whose centre is near the pupil of the eye. There are no scales on these covers. The branchial membrane is in a great measure covered ; it contains six orifices, the first and second much the shortest, and all of them much curved. The head and anterior part of the back as far as the beginning of the dorsal fin are without scales.

The back is arched, and becoming gradually thinner from the middle of the fish upward, and towards the root of the fin is marked on each side with a dotted line, composed of about twenty pores, placed in a single row, beginning even with the fin, and extending parallel to it, a little more than half its length.

The sides are gently convex. The abdomen nearly of the same figure with the back and is a little more arching : the carina is bony, as in the herring tribe, but not serrated. The lateral line is curved ; and near the back but not quite parallel to it. The anus linear, and one third nearer the head than to the tail. The tail narrow and terminated by a deeply divided fin.

The scales are rather small, imbricated, smooth, close, flexible, and easily rubbed off ; of a bright pearl colour.

There is a small horizontal spine, pointing forward, at the beginning of the dorsal fin ; another at the beginning of the anal fin : and a third, arising from the sternum and pointing backward, a little before the anus.

The dorsal fin occupies almost the whole length of the back, and terminates at the narrowing of the tail. It contains XLV rays, the four first simple, the rest branched, the fifth and sixth longest ; thence gradually shorter to the middle of the fin, from which they retain nearly the same length. The pectoral fins are lance shaped, about a quarter part as long as the fish, and furnished with XXI soft rays, the lower ones very short. There are no ventral fins. The anal fin is of the same form with the dorsal, but smaller ; extends as far back as that does, and is supported by XLII rays. The tail fin forked and acute, a little shorter than the pectoral and has XXI rays.

The whole length of the specimen from which the figure

was taken, was $9\frac{1}{2}$ inches, its breadth $3\frac{3}{16}$ inches, and its thickness $1\frac{1}{2}$ inch, in the thickest part.

This fish is furnished with two stomachs, one of which is situated near the throat and is nearly round, muscular, and rough on the inside ; the other is in the abdomen. It becomes putrescent so soon after being taken out of the water, that the internal economy could not satisfactorily be farther investigated.

In the principal particulars of its generic character it accords with the *Stromateus* of Linné ; its specific character may be taken from the spines with which it is armed : hence it may be defined *Stromateus* (*triacanthus*) *spinulâ antrorsum decumbente ante pinnam dorsalem et analem, aliâque posticâ spectante ante anum.* Linné in *Syst. Nat.* Vol. I. p. 432 mentions two species, the *Stromateus* (*Fiatola*) *subfasciatus*, and *St.* (*Paru*) *unicolor*, and to the latter he adds a synonym from Sloane's *Nat. Hist. of Jamaica*.* The specimen above described differs from the *Fiatola* in not being at all striped, and from the *Paru* it differs exceedingly in the form of the dorsal and anal fins, as well as in the spines, if Sloane's figure is accurate.

This genus appears to have been named by Artedi from *Στροματίς*, *Pulvinar*, as the gentle convexity of the sides gives somewhat the appearance of a cushion.

I have given it a trivial name and defined it as a new species ; and have been induced to this by being unable satisfactorily

* Sloane's *Nat. Hist. of Jamaica*, Vol. II. plate 250, fig. 4. *Pampus*.

torily to apply to it either of the Linnean definitions. As truth is the great object in inquiries of this kind, if I have fallen into an error, I shall think myself indebted to any experienced naturalist who shall set me right.

In the summer months, the fishermen sometimes find a single fish of this kind in their wears ; but since writing the above, a fisherman brought me four, which he took up with his hands from a crowded schull, that he believed occupied three acres in extent. They were taken on the New Hampshire coast, about a league from the mouth of the Piscataqua. There is no popular name for it. It is probably a migratory fish.

Fig. III. is the figure of a fish which is taken on the haddock grounds, principally in the months of March and April.

Its body is ensiform, subcylindric, diminishing gradually toward the tail ; slippery, covered with a copious lubricating humour and a very tenacious skin. The colour approaches umber, especially on the back ; on the abdomen pale, and in some specimens whitish.

From the middle line upwards, through the whole length, it is marked with darker spots, arranged in a triple series, so as to appear in a manner chequered.

The head declining, broader than the body, and smooth ; equal to about $\frac{1}{3}$ th part of the length of the fish. The mouth large and nearly horizontal. The snout a little acuminate. The upper jaw longest. The lips fleshy and thick, the upper one a little folded back ; the lower one loose, and pendant at the sides. There are no cirri.

The

The cheeks muscular and protuberant. Teeth conical in both jaws.

The upper front teeth larger than the lower, and placed in a double row ; the lower front teeth also in a double row ; the lateral ones, both above and below, simple, and extend as far back in the jaws as the angle of the mouth. The upper ones are about 18 in number, on each side ; the lower ones about 12 ; they are all bent a little back and in a great measure concealed by loose gums. There are no teeth in the palate. The nostrils are tubular, and situated about half way between the eyes and the extremity of the rostrum.

The eyes are placed high, are rather oval than round ; rather small, and naked. The Iris golden. The branchial membrane contains six strong rays, and is but little covered.

The back is nearly straight ; the abdomen tumid : lateral line small and obscure. The anus much nearer the head than the tail, so that from the throat to the anus is scarcely $\frac{1}{4}$ th part the length of the fish. The tail from the anus to the end, contains above $\frac{1}{3}$ ths of the length of the fish, and tapers gradually to its extremity, ending in a point. The scales are small, nearly oval, separate, adhering by their whole under surface, and a little sunk beneath the superficies of the skin. They are represented by dots in the figure.

The dorsal fin begins a little back of the head, extends the whole length of the back, is united with the tail fin, and at its point joins the anal fin. It contains CXLVI rays, XVIII of which,

which, from the 99th to the 116th inclusive are very short, curved backward, and pointed ; the rest are soft and branched. The pectoral fins are rounded and contain XX strong branched rays. The ventral fins are placed under the throat and contain III rays. The anal fin extends from the anus to the extremity of the tail where it is united with the dorsal, and contains CXXIII branched rays. The caudal fin is so united with the dorsal and anal that it is difficult to separate them ; it is therefore divided equally between them. The last rays are so minute that they cannot be enumerated without removing the skin.

In the internal economy, as well as in several external particulars, it resembles the catfish. The ovarium is single ; and like other fishes which reside at the bottom, it has no air bladder.

It feeds principally on echini and æsteriæ of several species. To collect its food, it is necessary that it should frequent rocky places, and to this it must be owing, that in the larger individuals, the ventral fins are entirely obliterated, except two small cicatrices ; so that at first view they appear to be a species of *Anarhicas*.* It is therefore from the younger fish only that the classical character can be determined. From the resemblance above mentioned it has probably obtained the
name

* *Lupus marinus* of authors. *Anarhicas Lupus* of Linné, called here catfish, and wolf fish, or catfish in Dr. Cullen's catalogue of the *Mater. medic.*

name of Wolf, by which it is known to our fishermen. It is sometimes called Conger Eel. In the consistence of the muscles it is like the eel, and deprived of its head and skin, it is sometimes sold as such ; but it is preferable to the eel, as it feeds on living food ; whereas the eel feeds on carcases. The largest I have seen was 31 inches in length.

This fish is a species of *Blennius* : it appears to differ from all the Linnean *Blennii*, and uncertain whether it has ever been described, I shall take its trivial name from the form of its body, and call it *Blennius (anguillaris) pinnis dorsali, anali, caudalique unitis ; dorsali prope caudam radiis octodecim abbreviatis spinosis*.

The fish represented at fig. IV, is of the carp kind and is the *Cyprinus (Catoftomus) pinnâ ani radiis octo, labio imo carunculâ bilobatâ papillofa, caudâ bifidâ* ; first described and figured by Dr. John Reinhold Forster in the 63d Vol. of Transactions of the Royal Society. His figure, compared with this, will be found to differ in the form of the head, although they both have the same specific marks.

Dr. Forster observes that, in his specimen, “ the head was full of elevations and tubercles ; that he could not determine the colour of the iris of the eye ; that the body was compressed or flat.” It seems probable from these circumstances, that his specimen had been exposed to the air and in some measure dried before he received it. The delineation here given was made with tolerable accuracy from a specimen newly taken.

The

The head had no remarkable elevations except that over the nose and the futures expressed by dotted lines in the figure. It is one of the roundest of its genus. The head is of the same breadth with the body, "gradually decreasing toward the nose. The mouth is quite under the head; when shut, it is semilunar; when open, round; not far from the extremity of the snout and included in small round lips. To the under lip is fixed a bilobate, beardlike, papillose caruncle. There are no teeth." The eyes are rather large, the iris of a pale, golden colour. There are III rays in the branchial membrane. "Over each eye is a longitudinal future." There is no transverse future between the nostrils. "On the covers of the gills are two, one on each side, beginning near the lobes of the caruncle of the under lip and going up arched toward the eye. Near the extremity of the snout begins on each side a longitudinal one, passes round the eye and mounts in a curvature behind it, then it goes on" a little waving "to the end of the head, where it again gets downwards and joins the lateral line. Where the head joins the body the two futures are connected by a transverse one, which, as it were, separates the head from the body. The lateral line at first descends, then runs on straight, rather nearer the back than the belly, to the beginning of the tail."

The top of the head, and back are of an umber colour, becoming paler on the sides; the body underneath is whitish with a cast of fawn colour, and according as it is placed in the sun, reflects a golden lustre.

"The

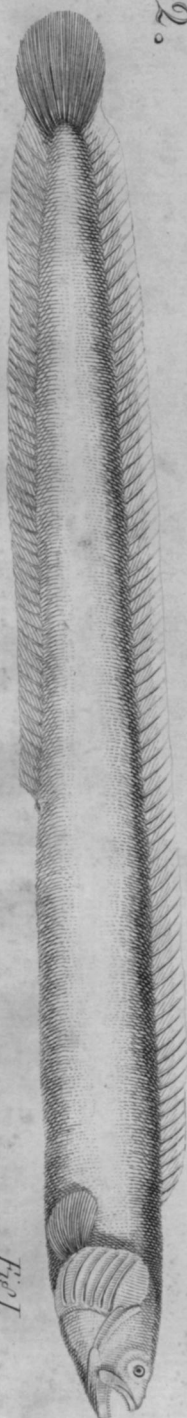


Fig. 1.

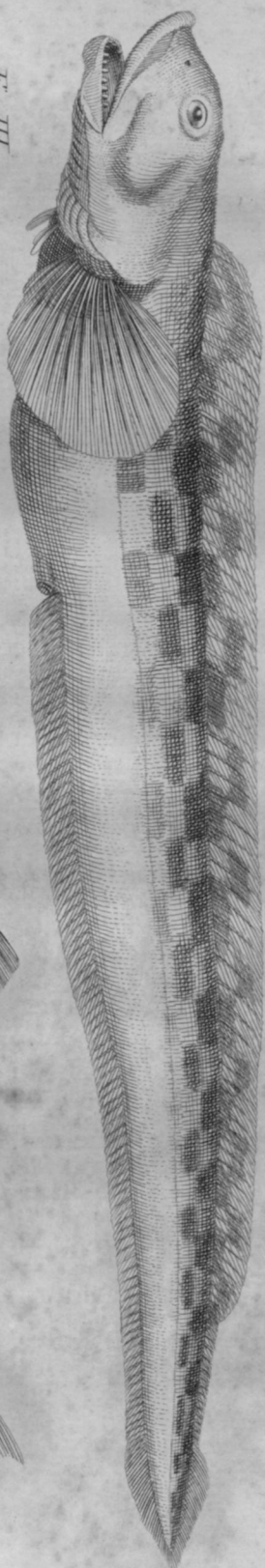


Fig. 3.

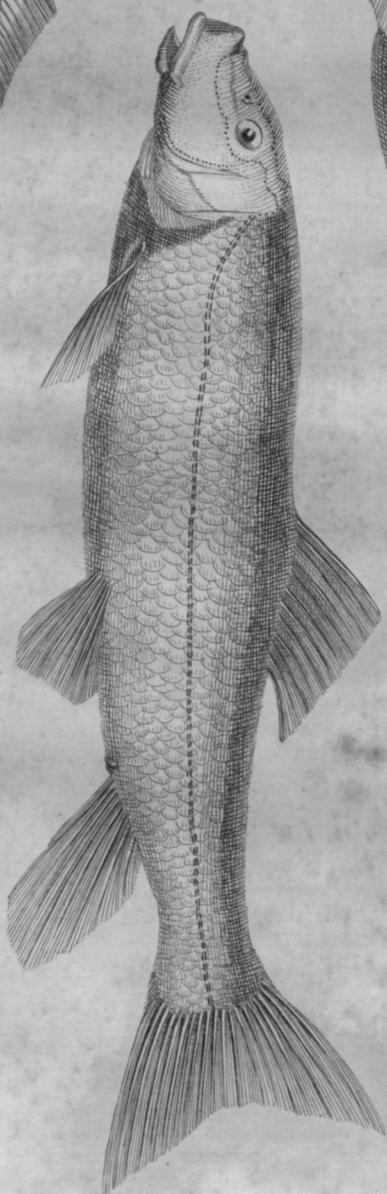
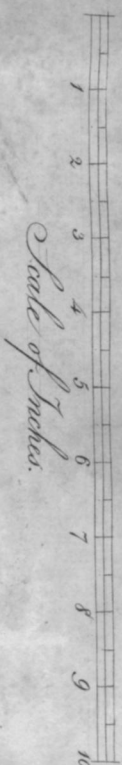


Fig. 4.



Fig. 2.



"The scales are small near the head and back, increasing in size toward the middle and tail, close to which they are again smaller. The dorsal fin is somewhat behind the equilibrium of the fish, rhomboidal and consisting of XII strong branched rays."*

Pectoral fins of a broad lance shaped figure, placed near the covers of the gills, and contain XVII rays. The ventral fins have IX rays. The anal fin is rather large and strong, supported by VIII rays, the first of which is simple, the rest branched, the last divided at its base, and has the appearance of two rays. "The tail somewhat forked or concave," and contains XIX rays. The pectoral, ventral, and anal fins are tinged with yellow.

Dr. Forster's specimen was from Hudson's bay, and he mentions "two varieties, both whitish; but one distinguished by a mixture of a beautiful red." This which is found in our waters is probably a third variety. The most remarkable particular in its internal structure is the form of the air bladder, which at about 1d part from its anterior extremity is contracted into a small neck, in such a manner that there appear to be two bladders; the anterior nearly round, the posterior oblong and somewhat conical.

It is called Sucker in the neighbourhood of Boston, and in the District of Maine it is improperly named Barbel.

KITTERY, 19th Sept. 1794.

II. *On*

*For these quotations, see Phil. Transact. of Royal Soc. of Lond. Vol. 63. part I. page 155, and for the figure, see plate 6, page 157, ejusdem.